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**Introduction: Reimagining Epistemology and Philosophy of Science from a Global Perspective**

David Ludwig

Global challenges such as climate change, food security, public health, and sustainable energy require critical reflection on knowledge production and knowledge diversity. This book aims to contribute to the negotiation of these global challenges along two lines: On the one hand, we want to showcase the potential of epistemology and philosophy of science in addressing knowledge diversity on a global scale and its entanglement with scientific, technological, and political practices. On the other hand, we also want to challenge academic philosophy to become more engaged with questions of global knowledge production that often remain in the periphery of mainstream epistemology and philosophy of science. This book is therefore an invitation to reimagine epistemology and philosophy of science as globally engaged fields that integrate tools from academic philosophy with critical reflection about heterogeneous forms of knowledge production and their interactions with local livelihoods, practices, and policies.

In addressing social and environmental crises on local and global scales, modern science and technology are often contested as part of the solution as well as part of the problem. Policy responses to issues such as environmental destruction or the COVID-19 pandemic require scientific expertise that appears increasingly fragile and threatened by the global rise of anti-science populism. At the same time, current social and environmental crises do not only require scientific expertise, but are also the product of technological and scientific modernity. Modern agricultural science and technology, for example, may be indispensable in meeting the global challenge of “feeding the world” but is simultaneously a driving force in the loss of biodiversity through monocropping and pesticide application, in deforestation through expansive industrial farms, in food insecurity through displacement of smallholders farmers and land grabbing, in soil erosion through industrialization and intensification, and so on (Macnaghten and Carro-Ripalda 2015).

On the one hand, epistemology and philosophy of science could contribute to navigating this complexity by fostering critical reflexivity beyond simple narratives about science as the sole solution or the root cause of a world in perpetual socio-environmental crisis. On the other hand, academic philosophy often seems woefully ill-equipped to fill this role in both public and academic controversies about responses to global challenges. While “global challenges” have become ubiquitous in science and innovation policy (Kaldewey 2018), there remains little interaction with mainstream epistemology and philosophy of science (see, however, Efstathiou 2016). Critical perspectives on modernization and the colonial legacies of science are also largely produced outside of academic philosophy as illustrated by Harding’s *Postcolonial Science and Technology Studies Reader* (2011) that is edited by a philosopher but mostly showcases scholarship from other fields such as anthropology, history, and sociology.

Rather than giving up on academic philosophy as a source for critical scholarship, this book explores the potential of epistemology and philosophy of science to contribute to negotiating knowledge, science, and technology on local and global scales. There are many reasons to be optimistic about the potential of these fields. Epistemology has grown into a dynamic and interdisciplinarily engaged field that provides much more than textbook debates about the definition of “knowledge” as “justified true belief”. For example, the field has come a long way in considering cross-cultural variability of epistemological core terms including “knowledge” (Kiper et al., chapter 5) and addressing the normative dimensions of negotiations of knowledge through notions such as “epistemic injustice” (Koskinen and Rolin, chapter 9). Philosophy of science has also moved beyond general debates about “the structure of science” (Nagel 1961) towards pluralist models that consider science in its heterogeneous disciplinary, geographic, and historical shapes (Kellert et al 2003, Ruphy 2016). One important implication of this development is that philosophers of science have become increasingly attentive about the interactions between scientific knowledge production and social values (Lacey, chapter 13; Douglas 2009, Elliott 2017) as well as more general debates about the role of science in democratic societies (Kurtulmuş, chapter 12; Kitcher 2011, van Bouwel 2015).

While all of these developments indicate the potential of philosophical reflexivity in addressing global knowledge production, intercultural contexts also provide an important challenge to the mainstream of both epistemology and philosophy of science. While philosophers have become increasingly attentive to questions of knowledge diversity and their normative implications, much of this debate remains focused on Europe and North America with little attention for the Global South. Furthermore, the question is not just *what* but also *who* is being represented in epistemology and philosophy of science. Turning attention to global dimensions of science runs the risk of reproducing epistemic injustices if it remains dominated by scholars from the Global North who are simply talking *about* (rather than *with*) the Global South. This book therefore constitutes an attempt to reimagine epistemology and philosophy of science through an intercultural and interdisciplinary conversation about global knowledge production.

**Social Contestations of Science**

Addressing science from a global perspective requires engagement with its contested status from decolonial critique (Harding, chapter 3) to anti-science populism (Reyes-Galindo, chapter 17). From the vantage point of the Global North, anti-science populism and anti-intellectualism provide powerful reminders of the need for policy that is informed by the scientific expertise (Collins, chapter 26). For many people in the Global South, however, encounters with scientific expertise have been encounters with colonial instruments of control. Writing from a Māori perspective, Smith’s (2013, 1) *Decolonizing Methodologies* summarizes this sentiment by writing that ‘research’ “is probably one of the dirtiest words in the indigenous world’s vocabulary. [...] The ways in which scientific research is implicated in the worst excesses of colonialism remains a powerful remembered history for many of the world’s colonized peoples. It is a history that still off ends the deepest sense of our humanity. Just knowing that someone measured our ‘faculties’ by filling the skulls of our ancestors with millet seeds and compared the amount of millet seed to the capacity for mental thought offends our sense of who and what we are.”

Even after the political fall of colonial empires and their academic instruments such as “race science” (Msimang, chapter 21), the role of science often remains contested among scholars in the Global South. Institutionalized science remains deeply entangled with radical transformations of an allegedly underdeveloped “Third World” through market-driven agendas of technological modernization and economic growth (Ludwig and Macnaghten 2020). Resistance against these agendas by both social movements and scholars in the Global South reflects the wide range of cultural, environmental, and social damage of such modernist visions of development (e.g. Shiva 1991, Esteva 2011). Locating the role of science in this critique of modernist and growth-oriented development, Escobar (2018, 89) argues that in “third-world contexts [...] science has become the most central political technology of authoritarianism, irrationality, and oppression of peoples and nature. As a reason of state, science operates as the most effective idiom of violent development and even standardizes the formats of dissent. [...] Organized science thus becomes ineffective as an ally against authoritarianism and increasingly dependent on market-based vested interests. This motivates the powerful and perhaps startling indictment.”

Escobar’s framing of science as an instrument of a brutal modernist vision of development echos with some contributions of this volume such as Harding’s discussion of anti-colonial feminism (Harding chapter 3 ) and especially Harris’ (chapter 8) discussion of the fallist movement in South Africa that challenged the marginalization of African perspectives with the slogan *Science Must Fall*. The chapters of this book, however, tell heterogenous stories that do not add up to one straightforward narrative of science as colonial and modernist domination. Reyes-Galindo’s (chapter 16) discussion of “post-truth” and “fake news”, for example, addresses vilification of Brazilian research through an administration that sees science as an obstacle for an agenda that pushes economic development at the price of environmental and public health concerns. While Reyes-Galindo’s chapter addresses the COVID-19 pandemic as the “apex of a ‘war’ declared by Bolsonaro on the country’s scientific and educational institutions since entering office”, Oliveira (chapter 15) discusses “innovationism” in Brazil as the meeting ground of scientific and political elites in formulating neoliberal agendas of growth that exacerbate social-environmental crises. Even within a single national context such as Brazil, science therefore takes too many forms and roles to fit a simple narrative of being a hero or a villain.

Rather than thinking of science as performing one essential societal function - from “colonial domination” to “rational reasoning” - the contributions of this book add to a multi-layered picture that can be aptly described with Collins’ (chapter 26) metaphor of “science as craftwork”. As Collins argues, “sciences that confront the citizen in the political sphere aren’t exact and aren’t open to being presented as magic or religion.” Instead, they are crafts and skillful practices of asking questions, collecting evidence, and drawing conclusions. This book presents a kaleidoscope of these historically and culturally shaped craftworks from physics in Japan (Ito chapter 23) to medicine in South Africa (Mncube chapter 20) to logic (Tanaka chapter 24) and mathematics (Sirker chapter 25) in India. The different cultural and disciplinary shapes of scientific practices do not lead to a universal characterization of science and its function in a global arena. Instead, they lead to a pluralist picture of heterogeneous crafts with equally heterogeneous epistemic and social functions.

While the chapters of this book complement each other in composing such a pluralist picture, this does not mean that the authors agree in all of their characterizations of science. Collins’ take on “science as craftwork” is decisively optimistic by presenting science as a “craftwork *with integrity*” and emphasizing: “Science has to be respected, not because it is always right, like magic or religion are said to be; it isn’t always right but is still the best way to generate conclusions which feed into politics. Science is craftwork with integrity and that is the best we can hope for” (chapter 26). Other contributions of this volume - e.g. Pinto (chapter 14), Harding (chapter 3), Harris (chapter 8), Koskinen and Rolin (chapter 9) - focus on contexts in which the integrity of science becomes questionable both by being dominated through particular interests and by dominating other forms of knowledge production that are not institutionalized as science.

**Scientific Pluralisms and Knowledge Diversity**

Knowledge about the world is produced by diverse epistemic communities (Santos 2015, Harding 2015). Some of this plurality is internal to science and the contributions of this book span a wide range of fields such as ecology (Poliseli and Leite chapter 6), logic (Tanaka chapter 24), geography (Winther chapter 22), genetics (Msimang chapter 21) mathematics (Sirker chapter 25), medicine (Mncube chapter 20), physics (Ito chapter 23), psychology (Liu & King chapter 19), and so on. However, the idea of knowledge production as a “craftwork” also provides an opportunity to think of epistemological matters beyond institutionalized science (Janich 2015), and globally oriented philosophy of science requires engagement with the many varieties of Indigenous, traditional and local expertise that commonly remain marginalized in scientific practices (Liu and King chapter 19, Mika chapter 10, Chimakonam and Uchenna Ogbonnaya chapter 17).

Addressing this epistemic diversity is particularly urgent in the context of global challenges of intertwined social and environmental issues that cannot be addressed through restricted disciplinary perspectives (Scholz and Steiner 2015). Nagatsu and Thorén (chapter 7) introduce sustainability science as an interdisciplinary field that requires to move “beyond the natural-social divide” and its associated disciplinary methods. Using the case studies of fisheries management and climate science, Nagatsu and Thorén argue for a systems perspective that can integrate various variables and trade-offs in concerns about resource allocation and conservation. As Poliseli and Leite (chapter 6) point out, however, interdisciplinary knowledge integration is not always a smooth process as it involves different methodological approaches and ways of positioning science towards “wicked problems” such as environmental and public health challenges. Given the heterogeneous forms of expertise that are involved in engaging with these wicked problems, Poliseli and Leite focus on the “interplay between trust and disagreement” in developing epistemically productive tensions between research programs.

Questions of knowledge integration and disagreement do not only arise in the context of interdisciplinary engagement between natural and social sciences but become even more urgent in transdisciplinary contexts that involve both academic and non-academic actors. On the one hand, transdisciplinary knowledge integration constitutes a core demand for globally engaged epistemology and philosophy of science. Rather than assuming the epistemic priority of Western science, transdisciplinary approaches can contribute to acknowledgement of diverse forms of “situated knowledge” (Haraway 1988) and especially of “Epistemologies of the South” (Santos and Meneses 2009, Santos 2015) that remain often marginalized in academia through the dominance of English (Yen chapter 2) and the European tradition of academic knowledge production more generally. Recognition of diverse academic and non-academic epistemic communities is therefore a crucial component in challenging epistemic injustices (Koskinen and Rolin chapter 9) and incorporating the insights of diverse epistemic standpoints into scientific practices (Harding 2015, Wylie 2013, Koskinen and Rolin 2019). On the other hand, epistemic diversity also constitutes a pressing challenge for academic philosophers who develop their models on the basis of often idealised case studies of institutionalized science, and examples drawn from its history, and thus lack resources for navigating methodological and political tensions of negotiating knowledge in transdisciplinary trading zones (Galison 1997, Robles-Piñeros et al. 2020).

**3. Linking Epistemologies with Ontologies and Values**

Epistemic diversity is an important starting point for addressing knowledge production and scientific practices from a global perspective (Ludwig and Koskinen, chapter 1). At the same time, emphasis on diversity alone is not sufficient but can contribute to a misleading picture of harmonious knowledge integration which fails to address tensions between heterogeneous epistemic communities and their practices. Knowledge systems are not sets of propositions that can be simply added up into a larger set that provides a more comprehensive knowledge base and leads to better solutions. Instead, different knowledge systems and epistemologies are often entangled with conflicting ontologies and values that lead to very different epistemic practices (Ludwig and El-Hani 2020).

In the African context, the contributions of Chimakonam and Uchenna Ogbonnaya (chapter 17) as well as Mncube (chapter 20) provide case studies of this complexity in the environmental and medical domains. Focusing on the Igbo concept ‘nmandu’, Chimakonam and Uchenna Ogbonnaya highlight a biocentric conception of the world along the Igbo saying ‘everything there is, is part of the web of life’. Contrasting this perspective with anthropocentric thinking, the authors highlight biocentricism as a core feature of African philosophies that comes with distinct epistemological but also ontological and ethical assumptions. Chimakonam and Uchenna Ogbonnaya’s case study complements wider debates about Indigenous and traditional knowledge that stress its importance for developing sustainable relations with environments, but also highlight that this knowledge is entangled with holistic and relational ways of being in the world (Cajete 2000, Wilson 2008). Mncube’s discussion of African Traditional Medicine (chapter 20) develops a related case through practices of South African *izangoma* (diviners) while also warning that the decolonization of medicine needs to avoid a wholesale relativism in medicine.

Writing from a Māori perspective, Mika’s (chapter 10) discussion of the relation between Indigenous worldviews and research methods reinforces some of the core lessons from the African context that are stressed by Chimakonam, Uchenna Ogbonnaya, and Mncube. Emphasizing the holistic character of Māori ontologies, Mika points out that “it is difficult to imagine that the research methods we employ today align with traditional indigenous approaches” and that “we have to deal with the possibility that research methods, as they are currently employed, do not correspond with indigenous first principles of existence”. Rather than simply assuming smooth integration of Indigenous knowledge and methods into academic research, serious engagement with Indigenous perspectives requires engagement with unresolved tensions.

Different ways of producing knowledge reflect different ways of being in the world and global negotiations of epistemologies therefore require simultaneous negotiations of ontologies and values. Emphasis on the ontological dimension of knowledge diversity converges with a wider debate about the “ontological turn” (Holbraad and Pederson 2017) that has its origin in cultural anthropology (De la Cadena 2007, Viveiros de Castro 2009) but has also been increasingly adopted in debates about science and technology (Pickering 2017). As Risjord (chapter 11) spells out, the ontological turn in anthropology emerges from a critique of theorizing cultural diversity as a representational diversity of beliefs about the world. Moving debates from diversity of representations about the world towards ontological diversity of ways of being in the world raises important questions about addressing epistemologies and science from a global perspective. While cross-cultural studies of epistemic diversity often mobilize representationalist frameworks of different beliefs about the world, Risjord proposes an ecological model of “cognition as embodied, embedded, enactive, and extended” and thereby emphasizes the need to address the situatedness of knowledge systems and their entanglement with different practices on a global scale.

**Political Philosophy of Science**

Negotiating knowledge production on a global scale is a deeply political matter: whose concerns and questions matter? Whose concepts and ontologies? Whose methods and practices? Different answers to these questions lead to heterogeneous and often conflicting perspectives on scientific practices and their politics. As Guo and Ludwig (chapter 4) point out, the relation between politics and philosophy of science is complex and historically unstable. In the Anglophone literature, the historical narrative commonly moves from a politicized environment of European philosophy of science in the early 20th-century to a post-war depoliticization in the United States to a more recent surge of normative concerns in areas such as feminist philosophy of science (Risch 2005, Howard 2009). Using the case study of Chinese philosophy of science, Guo and Ludwig argue that this periodization does not fit countries such as China that have been shaped by different dynamics of philosophers of trying to create independence from and to prove usefulness to the interests of the Communist Party.

Even if dynamics of politicization and depoliticization differ between philosophical communities, the emergence of “political philosophy of science” (Rouse 1987, López Beltrán and Gómez 2013) provides important resources for addressing knowledge production on a global scale. The relation between science and values has been one focal point of recent philosophy of science as outlined by Lacey (chapter 13). By expanding these debates towards the role of values in traditional and Indigenous knowledge, Lacey shows how values mediate between knowledge systems and the ways of life of the communities who employ them. Questions of democratization provide another important entry point for political philosophy of science. Kurtulmus (chapter 12) traces the development of governance debates from earlier arguments that science needs to be free from societal biases to more recent cases for demanding democratic legitimacy of scientific research (Wilholt 2012).

While political philosophy of science provides important entry points for a globally oriented debate about knowledge production, this book also provides challenges to further expand and rethink debates about political philosophy of science. As Fraser (2009) points out, the global state of socio-environmental challenges requires novel approaches of thinking about questions of social justice as transcending national framings. Fraser’s account of global justice therefore shifts attention towards the politics of representation and misrepresentation: who gets a voice in negotiating economic questions of distribution and cultural questions of recognition?

Misrepresentation can take the form of marginalization of stakeholders through the legacy of colonial structures of domination (Harding, chapter 3) and other forms of epistemic injustice (Koskinen and Rolin, chapter 9). However, misrepresentation can also take the form of overrepresentation of actors with institutional power to shape research agendas. Pinto’s (chapter 14) discussion of industry funding in Latin America provides a lively illustration of this type of misrepresentation through commodification and privatization of science. As Pinto highlights, industry funding of science does not have homogenous effects around the world as research and development (R&D) may be outsourced to the Global South without reflecting local concerns or needs. In Pinto’s case study of pharmaceutical research, this misrepresentation leads to misdistribution of treatments which are developed in the Global South, but “do not contribute to the well-being of the local populations, as they do not target the relevant diseases, are not available, or are unaffordable.”

The aim of this volume, however, is not only to provide critical perspectives on misrepresentation but also to contribute to a positive vision of inclusive knowledge production that represents the wide range of actors and their epistemic traditions. First, this is a matter of broadening the scope of academic research that moves beyond the dichotomy between a Western centre and a global periphery of knowledge production (Ito, chapter 23) and instead recognizes the wide variety of traditions of academic knowledge production in fields such as psychology (Liu and King, chapter 19), logic (Tanaka, chapter 24), or geography (Winther, chapter 22). At the same time, a positive model of just representation also needs to include Indigenous and other local communities outside of institutionalized academia that are highlighted in diverse chapters of this book from Aotearoa/New Zealand (Mika, chapter 10) to Brazil (Oliveria, chapter 15; Reyes-Galindo, 17 chapter) to China (Guo and Ludwig, chapter 4; Liu & King, chapter 19) to Nigeria (Chimakonam and Uchenna Ogbonnaya, chapter 17) to South Africa (Harris, chapter 8; Mncube, chapter 20; Msimang, chapter 21). Both critical cases of misrepresentation and positive cases of inclusive knowledge production suggest opportunities for expanding political philosophy of science beyond established debates about values and democratization towards questions of global justice.

**Rethinking Science, Reimagining Philosophy of Science**

The ambition of this book is two-fold. On the one hand, we aim to show the relevance of epistemology and philosophy of science for addressing global knowledge production and scientific practices. While history (Chambers and Gillespie 2000, Schiebinger 2005) and social studies (Harding 2011, Reyes-Galindo 2017) of science have become increasingly concerned with global configurations of research, academic philosophy often marginalizes global perspectives as niche fields such as “development ethics” or “intercultural philosophy” without much interaction with the mainstream of the discipline. However, these configurations interact with core questions about epistemology, ontology, and scientific practice. This book showcases how philosophy can make innovative contributions to addressing these questions both through more general debates about issues such as “epistemic injustice” (Koskinen and Rolin, chapter 9), “transdisciplinary methods” (Poliseli and Leite chapter 6), “evolutionary models” (Chellappoo, chapter 18) “science and values” (Lacy, chapter 13), “democratization of science” (Kurtulmuş, chapter 12) and by situating them in concrete case studies of different disciplines and geographic contexts.

At the same time, this book showcases globally engaged research by a global community of philosophers that is far from representative from the mainstream of epistemology and philosophy of science as reflected in major journals or conferences. Indeed, there is increasing awareness in some subcommunities such as experimental philosophy (Kiper et al., chapter 5; Stich et al. 2018) and emerging debates about linguistic diversity in philosophy and science (Yen, chapter 2; Gobbo and Russo 2020). At the same time, the mainstream of both academic epistemology and philosophy of science have a long way to go in developing more inclusive research agendas that reflect the standpoints of heterogeneous actors beyond Western academia and the requirements of addressing knowledge production in the light of pressing social-environmental problems from climate change to food security to global health. In this sense, this book does not only make a case for the relevance of philosophical reflexivity but is also an invitation to reimage epistemology and philosophy of science as inclusive disciplines that engage with the most urgent societal concerns about knowledge production and scientific practice on a global scale.

**References**

Cajete, G. (2000). *Native Science: Natural Laws of Interdependence*. Clear Light Pub.

Chambers, D. W. & Gillespie, R. (2000). Locality in the History of Science: Colonial Science, Technoscience, and Indigenous Knowledge. *Osiris* 15, 221–240.

de la Cadena, M.( 2007). La Producción de Otros Conocimientos y Sus Tensiones:?` de La Antropología Andinista a La Interculturalidad? In Degregori, C. I. & Sanvoval*, P., eds. Saberes Periféricos. Ensayos Sobre La Antropología En América Latina*, 107–152.

Douglas, Heather. (2009). *Science, Policy, and the Value-Free Ideal*. University of Pittsburgh Press.

Elliott, K. C. (2017). *A Tapestry of Values: An Introduction to Values in Science*. Oxford University Press.

Escobar, A. (2018). *Designs for the Pluriverse*. Duke University Press.

Esteva, G. (2011). Más allá del desarrollo: la buena vida. *Aportes Andinos* No. 28. Quito: Universidad Andina Simón Bolívar, 1–6.

Fraser, N. (2009). *Scales of Justice: Reimagining Political Space in a Globalizing World*. Vol. 31. Columbia University Press.

Galison, P. (1997). *Image and Logic: A Material Culture of Microphysics*. University of Chicago Press.

Gobbo, F & Russo, F. (2020). Epistemic Diversity and the Question of Lingua Franca in Science and Philosophy. *Foundations of Science* 25 (1), 185–207.

Haraway, D. (1988). Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective. *Feminist Studies* 14 (3), 575–599.

Harding, S. (2011). *The Postcolonial Science and Technology Studies Reader*. Duke University Press.

Harding, S. (2015). *Objectivity and Diversity: Another Logic of Scientific Research*. University of Chicago Press.

Holbraad, M. & Pedersen, M. A. (2017). *The Ontological Turn*. Cambridge University Press.

Howard, D. (2009). Better Red than Dead—Putting an End to the Social Irrelevance of Postwar Philosophy of Science. *Science & Education* 18 (2), 199–220.

Janich, P. (2015). *Handwerk Und Mundwerk: Über Das Herstellen von Wissen*. CH Beck.

Kaldewey, D. (2018). The Grand Challenges Discourse: Transforming Identity Work in Science and Science Policy. *Minerva* 56 (2): 161–82.<https://doi.org/10.1007/s11024-017-9332-2>.

Kellert, S. H., Longino, H. & Waters, C. K. (2006). *Scientific Pluralism*. Vol. 19. University of Minnesota Press.

Kitcher, P. (2011). *Science in a Democratic Society*. Prometheus Books.

Koskinen, I. and Rolin, K. (2019). Scientific/Intellectual Movements Remedying Epistemic Injustice. *Philosophy of Science*, 1-18. <https://doi.org/10.1086/705522>

López Beltrán, C. & Velasco Gómez, A. (2013). *Aproximaciones a La Filosofía Política de La Ciencia.* UNAM.

Ludwig, D. & El-Hani, C. N. (2020). Philosophy of Ethnobiology: Understanding Knowledge Integration and Its Limitations. *Journal of Ethnobiology* 40 (1), 3–20.<https://doi.org/10.2993/0278-0771-40.1.3>.

Ludwig, D. & Macnaghten, P. (20200. Traditional Ecological Knowledge in Innovation Governance: A Framework for Responsible and Just Innovation. *Journal of Responsible Innovation* 7 (1), 26–44.<https://doi.org/10.1080/23299460.2019.1676686>.

Macnaghten, P. & Carro-Ripalda, S. (2015). *Governing Agricultural Sustainability: Global Lessons from GM Crops*. Routledge.

Nagel, E. (1961). *The Structure of Science*. Harcourt, Brace & World.

Pickering, A. (2017). The Ontological Turn: Taking Different Worlds Seriously. *Social Analysis* 61 (2), 134–150.

Reisch, G. A. (2005). *How the Cold War Transformed Philosophy of Science: To the Icy Slopes of Logic*. Cambridge University Press.

Reyes-Galindo, L. & Duarte, T. R. (2017). *Intercultural Communication and Science and Technology Studies*. Palgrave.

Robles-Piñeros, J. Ludwig, D., Baptista, G. & Molina, A. n.d. Intercultural Science Education as a Trading Zone Between Traditional and Academic Knowledge. *Studies in History and Philosophy of Biological and Biomedical Sciences*, 2020.

Rouse, J. (1987). Knowledge and Power: Toward a Political Philosophy of Science.

Ruphy, S. (2016). *Scientific Pluralism Reconsidered*. Pittsburgh University Press.

Santos, B. S. (2015). *Epistemologies of the South: Justice against epistemicide.* Routledge.

Santos, B. S. & Meneses, M. P. (2009). *Epistemologias do Sul*. Almedina.

Schiebinger, L. (2005). Forum Introduction: The European Colonial Science Complex. *Isis* 96 (1), 52–55.

Scholz, R. W. & Steiner, G. (2015). Transdisciplinarity at the Crossroads. *Sustainability Science* 10 (4), 521–526.

Shiva, V. (1991). *The Violence of Green Revolution: Third World Agriculture, Ecology and Politics*. Zed Books.

Smith, L. T. (2013). *Decolonizing Methodologies: Research and Indigenous Peoples*. Zed Books Ltd.

Stich, S. Mizumoto, M. & McCready, E. (2018). *Epistemology for the Rest of the World*. Oxford University Press.

Van Bouwel, J. (2015). Towards Democratic Models of Science: Exploring the Case of Scientific Pluralism. *Perspectives on Science,* 23 (2), 149–172.

Viveiros de Castro, E. (2009). *Métaphysiques Cannibales*. Presses Universitaires de France.

Wilholt, T. (2012). *Die Freiheit der Forschung: Begründungen und Begrenzungen*. Originalausgabe. Suhrkamp Verlag.

Wilson, S. (2008). *Research Is Ceremony: Indigenous Research Methods*. Fernwood Pub.

Wylie, A. (2013). Why Standpoint Matters, In Figueroa, R. & Harding, S., eds. *Science and Other Cultures*, Routledge, 34–56.